

Remarks

Favorable reconsideration of this application, in view of the above amendments and in light of the following remarks and discussion, is respectfully requested.

Claims 1-12 are currently pending in the application; Claims 1, 5, 9, and 11 having been amended by way of the present response. Applicants respectfully assert that support for the changes to the claims is self-evident from the originally filed disclosure, including the original claims, and that therefore no new matter has been added.

In the outstanding Office Action the abstract was objected to; Claims 1-8, 10, and 11 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,195,212 to Miyamoto in view of U.S. Patent No. 5,392,100 to Yoshida; and Claim 12 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Miyamoto in view of U.S. Patent No. 5,969,878 to Koizumi.

Initially, Applicants express thanks for the Examiner's indication that Claim 9 recites allowable subject matter, such that the claims although having been objected to would be allowable if rewritten in independent form. In response, Applicants have so-rewritten Claim 9. Applicants have further amended Claim 9 in a non-narrowing manner to remedy potential informalities and to place the claim in better conformity with standard U.S. practice. Thus, in accordance with the Examiner's indication of allowable subject matter, Applicants respectfully request the allowance of Claim 9.

As stated above the abstract was objected to. In response, Applicants have amended the abstract so as to be one paragraph. Thus, Applicants respectfully request that the objection to the abstract be withdrawn.

As stated above Claims 1-8, 10, and 11 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Miyamoto in view of Yoshida. Claim 12 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Miyamoto in view of Koizumi. Applicants

respectfully assert that the amendments to the claims have overcome the rejections for the following reasons.

The present invention is directed to a lens barrel and a camera including the lens barrel. Independent Claims 1 and 11 recite a cam cylinder including a cam configured to move a portion of a plurality of lens groups toward positions corresponding to a predetermined photographing state and a predetermined collapsed state along an optical axis. A cam follower is configured to move the portion of the plurality of lens groups by engaging with the cam and rotating relatively to the cam cylinder along the cam. An elastomer or resilient body is used for biasing the cam follower along the optical axis to slide the cam follower on the cam, a biased force of the elastomer or body varying in response to a moved position of the cam follower. A developed shape of the cam has different angles to a plane depending on a position in a collapsible region in which the cam follower is moved from a photographing state to a collapsed state. The developed shape of the cam is configured to suppress an increase in a rotational torque during movement of the cam follower between the photographing and collapsed states. The portion of the plurality of lens groups includes a lens group configured to be biased by the elastomer or body in a direction opposite to a collapsing direction.

Miyamoto is directed to a variable focal length lens barrel. As shown in Figure 13, for example, of Miyamoto, graph NO. 3 shows a relative stroke of a first lens group barrel 4 to a second driving barrel 3, which is obtained from relative rotations between the second driving barrel 3 and the first lens group barrel 4.¹

Applicants respectfully assert that Miyamoto does not teach or suggest, however, the claimed features of an elastomer or resilient body for biasing a cam follower to move a lens group biased by the elastomer or body in a direction opposite to a collapsing direction, the

¹ From Column 19, line 64 to Column 20, line 1.

cam follower engaging with a cam having a shape with different angles to suppress an increase in rotational torque during movement of the cam follower between photographing and collapsed states, as recited in independent Claims 1 and 11. Specifically, Applicants respectfully assert that the first lens group barrel 4 is at most analogous to the claimed features of a lens group biased in a direction opposite to a collapsing direction. Applicants respectfully assert, however, that Miyamoto does not teach or suggest biasing a cam follower to move the first lens group barrel 4 engaging with a cam having a shape with different angles to suppress an increase in rotational torque during movement of the cam follower between photographing and collapsed states. Rather, as shown in Figure 13 of Miyamoto, in a collapse region, the graph NO. 3 indicates a linear relationship, and therefore does not indicate the claimed features of a cam having a shape with different angles between photographing and collapsed states, or the claimed features of a cam having a shape with different angles to suppress an increase in rotational torque during movement of the cam follower.

Specifically, independent Claim 1 recites “a developed shape of said cam has different angles to a plane depending on a position in a collapsible region in which said cam follower is moved from a photographing state to a collapsed state, the developed shape of the cam is configured to suppress an increase in a rotational torque during movement of the cam follower between the photographing and collapsed states, and the portion of the plurality of lens groups comprises a lens group configured to be biased by the elastomer in a direction opposite to a collapsing direction,” and independent Claim 11 recites “a developed shape of said cam has different angles to a plane depending on a position in a collapsed region in which said cam follower is moved from a photographing state to a collapsed state, the developed shape of the cam is configured to suppress an increase in a rotational torque during movement of the cam follower between the photographing and collapsed states, and the

portion of the plurality of lens groups comprises a lens group configured to be biased by the resilient body in a direction opposite to a collapsing direction.”

The Office Action relies on Yoshida in an attempt to remedy the deficiencies of Miyamoto. Applicants respectfully assert that Yoshida also does not teach or suggest, however, the claimed features of an elastomer or resilient body for biasing a cam follower to move a lens group biased by the elastomer or body in a direction opposite to a collapsing direction, the cam follower engaging with a cam having a shape with different angles to suppress an increase in rotational torque during movement of the cam follower between photographing and collapsed states, as recited in independent Claims 1 and 11. Applicants respectfully assert that Yoshida is relied on to teach “a spring with a biased force . . . varying in response to a moved position of said cam follower.”²

Applicants respectfully assert that the claimed features recited in independent Claims 1 and 11 can provide numerous advantages that are not provided by the applied references. By way of specific non-limiting examples, Applicants respectfully assert that independent Claims 1 and 11 can suppress an increase in rotational torque during movement of a lens group, the lens group biased in a direction opposite to a collapsing direction, between photographing and collapsed states, through the use of a cam having a predetermined shape. In contrast, Applicants respectfully assert that unless a gradient of the cam is controlled, a large torque may be required to move such a biased lens group from the photographing state to the collapsed state.

Thus, for the above reasons, Applicants respectfully assert that neither Miyamoto nor Yoshida, whether taken alone or in combination, teaches or suggests the claimed features recited in independent Claims 1 and 11. Therefore, Applicants respectfully request that the

² Page 3, lines 5 and 6, and page 5, lines 20-22, of the Office Action.

Application No. 10/687,628
Reply to Office Action of June 29, 2004

rejection of independent Claims 1 and 11 under 35 U.S.C. § 103(a) be withdrawn, and the allowance of independent Claims 1 and 11.

Claims 2-8, 10, and 12 are allowable for the same reasons as independent Claims 1 and 11, from which they depend, as well as for their own features. Thus, Applicants respectfully request that the rejections of dependent Claims 2-8, 10, and 12 under 35 U.S.C. § 103(a) be withdrawn, and the allowance of dependent Claims 2-8, 10, and 12.

Consequently, in view of the present amendment, no further issues are believed to be outstanding in the present application, and the present application is believed to be in condition for formal Allowance. A Notice of Allowance for Claims 1-12 is earnestly solicited.

Should the Examiner deem that any further action is necessary to place this application in even better form for allowance, the Examiner is encouraged to contact the undersigned representative at the below listed telephone number.

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